

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State  
Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

Brand: METALUX

Report Number: P827766

Luminaire Tested: **OHBL-30HE-MCL-UNV-L930-CD-UPL30**

Issue Date: 5/3/2024



**Test Information**

Test Method: LM-79-08  
Report Number: P827766  
REPORT IS A COMBINATION OF REPORTS P826276 AND G3-2310-221-4  
Test Lab: INNOVATION CENTER  
Issue Date: 5/3/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: METALUX  
Catalog Number: OHBL-30HE-MCL-UNV-L930-CD-UPL30  
Description:  
Light Source: -  
Ballast/Driver: -

**Summary**

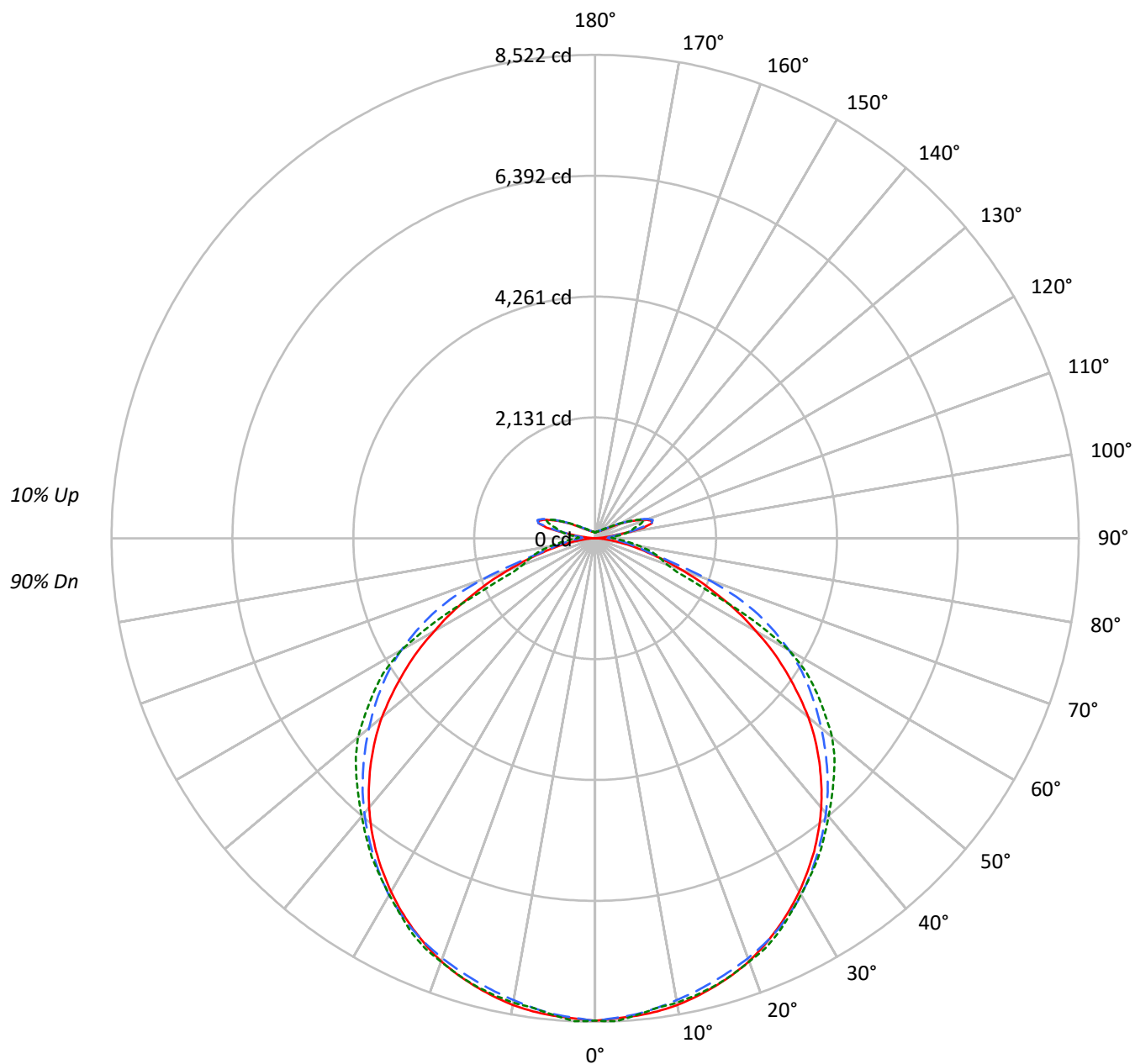
Lumens per Lamp: N/A  
Luminaire Lumens: 26514.1 lumens  
Efficiency: N/A  
Efficacy: 141.8 lumens/watt  
Spacing Criteria (0/90/45): 1.26 / 1.27 / 1.39  
Luminous Opening: Rectangular w/ Sides (W: 3.78' x L: 1.8' x H: 0.17')  
CIE Type: Semi-Direct

Input Watts (W): 187  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 25 FT

TEST NUMBER: P827766

CATALOG NUMBER: OHBL-30HE-MCL-UNV-L930-CD-UPL30

### Luminous Intensity Polar Plot





TEST NUMBER: P827766

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**COEFFICIENT OF UTILIZATION - ZONAL CAVITY METHOD:**

|     |     |     |     |     |  |     |     |     |     |  |     |     |     |  |    |    |    |  |    |    |    |
|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|--|-----|-----|-----|--|----|----|----|--|----|----|----|
| RF  | 20  |     |     |     |  | 20  |     |     |     |  | 20  |     |     |  |    | 20 |    |  |    |    | 20 |
| RC  | 80  |     |     |     |  | 70  |     |     |     |  | 50  |     |     |  |    | 30 |    |  |    |    | 10 |
| RW  | 70  | 50  | 30  | 10  |  | 70  | 50  | 30  | 10  |  | 50  | 30  | 10  |  | 50 | 30 | 10 |  | 50 | 30 | 10 |
| RCR |     |     |     |     |  |     |     |     |     |  |     |     |     |  |    |    |    |  |    |    |    |
| 0   | 117 | 117 | 117 | 117 |  | 113 | 113 | 113 | 113 |  | 105 | 105 | 105 |  | 99 | 99 | 99 |  | 93 | 93 | 93 |
| 1   | 107 | 102 | 98  | 94  |  | 103 | 99  | 95  | 92  |  | 93  | 90  | 87  |  | 87 | 85 | 83 |  | 82 | 80 | 78 |
| 2   | 97  | 89  | 83  | 77  |  | 94  | 87  | 81  | 76  |  | 81  | 77  | 72  |  | 77 | 73 | 69 |  | 72 | 69 | 66 |
| 3   | 89  | 79  | 71  | 64  |  | 85  | 76  | 69  | 63  |  | 72  | 66  | 61  |  | 68 | 63 | 58 |  | 64 | 60 | 56 |
| 4   | 81  | 70  | 61  | 55  |  | 78  | 68  | 60  | 54  |  | 64  | 57  | 52  |  | 60 | 55 | 50 |  | 57 | 52 | 48 |
| 5   | 75  | 62  | 53  | 47  |  | 72  | 60  | 52  | 46  |  | 57  | 50  | 45  |  | 54 | 48 | 43 |  | 51 | 46 | 42 |
| 6   | 69  | 56  | 47  | 41  |  | 66  | 54  | 46  | 40  |  | 52  | 44  | 39  |  | 49 | 43 | 38 |  | 46 | 41 | 37 |
| 7   | 64  | 51  | 42  | 36  |  | 61  | 49  | 41  | 36  |  | 47  | 40  | 35  |  | 45 | 38 | 34 |  | 42 | 37 | 33 |
| 8   | 59  | 46  | 38  | 32  |  | 57  | 45  | 37  | 32  |  | 43  | 36  | 31  |  | 41 | 35 | 30 |  | 39 | 33 | 29 |
| 9   | 55  | 42  | 34  | 29  |  | 53  | 41  | 34  | 28  |  | 39  | 32  | 28  |  | 38 | 31 | 27 |  | 36 | 30 | 26 |
| 10  | 52  | 39  | 31  | 26  |  | 50  | 38  | 31  | 26  |  | 36  | 30  | 25  |  | 35 | 29 | 25 |  | 33 | 28 | 24 |

**AVERAGE LUMINANCE (cd/sqm):**

|     | 0°    | 45°   | 90°   |
|-----|-------|-------|-------|
| 0°  | 13450 | 13450 | 13450 |
| 5°  | 13306 | 13255 | 13339 |
| 10° | 13201 | 13054 | 13246 |
| 15° | 13061 | 12904 | 13215 |
| 20° | 12920 | 12809 | 13156 |
| 25° | 12704 | 12714 | 13101 |
| 30° | 12472 | 12564 | 12918 |
| 35° | 12205 | 12326 | 12851 |
| 40° | 11873 | 12079 | 12740 |
| 45° | 11436 | 11795 | 12744 |
| 50° | 10867 | 11471 | 12746 |
| 55° | 10011 | 11152 | 12389 |
| 60° | 8919  | 10685 | 11592 |
| 65° | 7533  | 9819  | 7462  |
| 70° | 5938  | 7665  | 5528  |
| 75° | 4311  | 4550  | 5794  |
| 80° | 2842  | 3783  | 5842  |
| 85° | 1441  | 3466  | 6143  |



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**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 801.9   | 3.0       |
| 10°-20°   | 2299.5  | 8.7       |
| 20°-30°   | 3512.1  | 13.2      |
| 30°-40°   | 4261.4  | 16.1      |
| 40°-50°   | 4466.3  | 16.8      |
| 50°-60°   | 4047.2  | 15.3      |
| 60°-70°   | 2713.5  | 10.2      |
| 70°-80°   | 1218.5  | 4.6       |
| 80°-90°   | 447.4   | 1.7       |
| 90°-100°  | 324.4   | 1.2       |
| 100°-110° | 927.9   | 3.5       |
| 110°-120° | 743.7   | 2.8       |
| 120°-130° | 353.5   | 1.3       |
| 130°-140° | 181.4   | 0.7       |
| 140°-150° | 107.1   | 0.4       |
| 150°-160° | 64.0    | 0.2       |
| 160°-170° | 34.0    | 0.1       |
| 170°-180° | 10.4    | 0.0       |
| <hr/>     |         |           |
| 0°-30°    | 6613.5  | 24.9      |
| 0°-40°    | 10874.9 | 41.0      |
| 0°-60°    | 19388.4 | 73.1      |
| 0°-90°    | 23767.8 | 89.6      |
| 90°-120°  | 1996.0  | 7.5       |
| 90°-150°  | 2637.9  | 9.9       |
| 90°-180°  | 2746.0  | 10.4      |
| 0°-180°   | 26514.1 | 100.0     |

**CANDELA DISTRIBUTION:**

|      | 0°   | 22.5° | 45°  | 67.5° | 90°  | Flux |
|------|------|-------|------|-------|------|------|
| 0°   | 8505 | 8505  | 8505 | 8505  | 8505 |      |
| 5°   | 8449 | 8479  | 8420 | 8446  | 8435 | 804  |
| 15°  | 8175 | 8143  | 8085 | 8157  | 8167 | 2308 |
| 25°  | 7595 | 7562  | 7614 | 7684  | 7662 | 3501 |
| 35°  | 6732 | 6748  | 6816 | 6889  | 6862 | 4207 |
| 45°  | 5587 | 5678  | 5783 | 5931  | 5949 | 4304 |
| 55°  | 4111 | 4309  | 4603 | 4787  | 4776 | 3670 |
| 65°  | 2413 | 2790  | 3168 | 2673  | 2183 | 2404 |
| 75°  | 949  | 1377  | 1013 | 1037  | 1104 | 1037 |
| 85°  | 164  | 314   | 402  | 486   | 509  | 200  |
| 90°  | 7    | 138   | 252  | 310   | 322  | 14   |
| 95°  | 47   | 158   | 256  | 316   | 332  | 168  |
| 105° | 1037 | 1069  | 1030 | 806   | 723  | 980  |
| 115° | 723  | 728   | 748  | 761   | 749  | 724  |
| 125° | 359  | 371   | 393  | 387   | 384  | 336  |
| 135° | 217  | 222   | 228  | 239   | 240  | 171  |
| 145° | 161  | 165   | 169  | 172   | 173  | 103  |
| 155° | 133  | 136   | 138  | 140   | 138  | 62   |
| 165° | 117  | 118   | 119  | 120   | 120  | 33   |
| 175° | 107  | 108   | 107  | 106   | 106  | 10   |
| 180° | 105  | 105   | 105  | 105   | 105  |      |



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**CANDELA DISTRIBUTION (FULL):**

|        | 0°     | 22.5°  | 45°    | 67.5°  | 90°    |
|--------|--------|--------|--------|--------|--------|
| 0°     | 8504.7 | 8504.7 | 8504.7 | 8504.7 | 8504.7 |
| 2.5°   | 8470.3 | 8506.0 | 8461.7 | 8509.6 | 8521.9 |
| 5°     | 8449.4 | 8478.9 | 8419.9 | 8445.7 | 8434.6 |
| 7.5°   | 8411.3 | 8421.1 | 8351.1 | 8371.9 | 8349.8 |
| 10°    | 8354.7 | 8349.8 | 8267.4 | 8308.0 | 8312.9 |
| 12.5°  | 8271.1 | 8256.3 | 8182.5 | 8244.0 | 8245.2 |
| 15°    | 8175.2 | 8143.2 | 8085.4 | 8156.7 | 8166.6 |
| 17.5°  | 8064.5 | 8022.7 | 7984.6 | 8076.8 | 8062.1 |
| 20°    | 7935.4 | 7886.2 | 7878.8 | 7979.6 | 7942.8 |
| 22.5°  | 7775.5 | 7737.4 | 7754.6 | 7850.5 | 7827.2 |
| 25°    | 7594.8 | 7561.6 | 7614.4 | 7684.5 | 7662.4 |
| 27.5°  | 7404.2 | 7384.4 | 7444.8 | 7498.8 | 7455.8 |
| 30°    | 7195.1 | 7184.1 | 7263.9 | 7308.2 | 7254.1 |
| 32.5°  | 6967.6 | 6971.3 | 7047.5 | 7107.8 | 7057.4 |
| 35°    | 6731.5 | 6747.5 | 6816.4 | 6888.9 | 6861.9 |
| 37.5°  | 6472.0 | 6507.6 | 6576.5 | 6659.0 | 6630.7 |
| 40°    | 6197.8 | 6249.5 | 6325.7 | 6425.3 | 6399.5 |
| 42.5°  | 5901.4 | 5966.6 | 6065.0 | 6175.7 | 6173.2 |
| 45°    | 5586.6 | 5677.7 | 5783.4 | 5930.9 | 5949.4 |
| 47.5°  | 5259.5 | 5361.6 | 5495.6 | 5692.4 | 5720.7 |
| 50°    | 4904.2 | 5032.0 | 5199.3 | 5435.4 | 5452.6 |
| 52.5°  | 4508.2 | 4682.8 | 4904.2 | 5130.4 | 5109.5 |
| 55°    | 4110.9 | 4308.9 | 4602.8 | 4787.3 | 4776.2 |
| 57.5°  | 3715.0 | 3937.6 | 4294.2 | 4425.8 | 4424.5 |
| 60°    | 3272.3 | 3553.9 | 3943.7 | 4043.3 | 3944.9 |
| 62.5°  | 2862.8 | 3165.3 | 3569.8 | 3497.3 | 3160.3 |
| 65°    | 2412.7 | 2790.2 | 3167.8 | 2673.4 | 2182.7 |
| 67.5°  | 2013.1 | 2406.6 | 2690.6 | 1831.0 | 1567.9 |
| 70°    | 1610.9 | 2045.0 | 2097.9 | 1358.8 | 1340.4 |
| 72.5°  | 1254.3 | 1716.7 | 1447.4 | 1163.4 | 1222.4 |
| 75°    | 949.3  | 1377.3 | 1013.3 | 1036.7 | 1104.3 |
| 77.5°  | 692.3  | 1057.5 | 788.3  | 908.7  | 964.1  |
| 80°    | 475.9  | 748.9  | 643.1  | 763.6  | 801.8  |
| 82.5°  | 298.8  | 494.4  | 515.2  | 614.9  | 654.2  |
| 85°    | 163.5  | 313.6  | 402.1  | 485.7  | 509.1  |
| 87.5°  | 67.7   | 189.4  | 307.4  | 375.1  | 394.7  |
| 90°    | 6.9    | 137.7  | 251.5  | 310.0  | 322.3  |
| 92.5°  | 18.2   | 121.2  | 223.0  | 275.7  | 286.0  |
| 95°    | 47.3   | 158.1  | 255.8  | 316.5  | 331.9  |
| 97.5°  | 283.7  | 331.3  | 361.8  | 426.0  | 462.4  |
| 100°   | 559.0  | 629.9  | 536.9  | 565.1  | 572.9  |
| 102.5° | 881.2  | 926.8  | 780.4  | 677.9  | 657.4  |
| 105°   | 1037.2 | 1068.6 | 1030.4 | 805.9  | 723.1  |



TEST NUMBER: P827766

CATALOG NUMBER: OHBL-30HE-MCL-UNV-L930-CD-UPL30

**CANDELA DISTRIBUTION (continued):**

|        | 0°    | 22.5° | 45°   | 67.5° | 90°   |
|--------|-------|-------|-------|-------|-------|
| 112.5° | 836.3 | 851.4 | 876.8 | 877.4 | 860.5 |
| 115°   | 722.8 | 727.7 | 747.8 | 760.9 | 748.8 |
| 117.5° | 611.3 | 617.7 | 637.8 | 638.7 | 634.7 |
| 120°   | 515.9 | 524.4 | 538.8 | 540.0 | 534.8 |
| 122.5° | 432.6 | 444.7 | 462.3 | 459.5 | 453.5 |
| 125°   | 359.4 | 371.2 | 393.2 | 387.1 | 383.6 |
| 127.5° | 307.3 | 314.6 | 331.7 | 334.6 | 331.7 |
| 130°   | 266.1 | 273.8 | 288.0 | 294.6 | 293.7 |
| 132.5° | 239.0 | 245.9 | 255.3 | 262.6 | 261.8 |
| 135°   | 217.2 | 222.5 | 228.5 | 238.7 | 240.0 |
| 137.5° | 199.0 | 204.7 | 208.7 | 218.1 | 219.3 |
| 140°   | 185.3 | 189.3 | 192.1 | 198.7 | 200.7 |
| 142.5° | 171.9 | 176.4 | 179.2 | 184.5 | 186.6 |
| 145°   | 161.4 | 165.1 | 169.1 | 171.9 | 173.2 |
| 147.5° | 152.9 | 156.2 | 159.4 | 161.0 | 162.2 |
| 150°   | 145.7 | 148.1 | 151.3 | 152.1 | 152.9 |
| 152.5° | 139.2 | 140.8 | 143.2 | 144.9 | 144.9 |
| 155°   | 132.7 | 136.4 | 138.0 | 139.6 | 138.4 |
| 157.5° | 127.9 | 130.7 | 132.3 | 133.1 | 133.9 |
| 160°   | 123.8 | 125.9 | 127.5 | 128.3 | 129.1 |
| 162.5° | 120.2 | 121.8 | 122.6 | 123.4 | 124.2 |
| 165°   | 117.0 | 117.8 | 118.6 | 120.2 | 120.2 |
| 167.5° | 113.7 | 115.8 | 115.3 | 116.2 | 116.2 |
| 170°   | 111.3 | 112.1 | 112.9 | 111.7 | 111.7 |
| 172.5° | 108.9 | 109.7 | 110.5 | 109.3 | 109.3 |
| 175°   | 107.3 | 108.1 | 106.9 | 106.5 | 106.5 |
| 177.5° | 107.8 | 107.3 | 106.1 | 104.8 | 104.4 |
| 180°   | 105.2 | 105.2 | 105.2 | 105.2 | 105.2 |



Report Generated By 670246072 / DESKTOP-50001EG





— 0°-180°    - - 45°-225°    - - - 90°-270°







|        |        |        |        |       |       |
|--------|--------|--------|--------|-------|-------|
| 107.5° | 1037.6 | 1069.3 | 1068.2 | 955.3 | 844.5 |
| 110°   | 953.1  | 982.4  | 993.0  | 962.8 | 908.6 |



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

METALUX

Report Number: SP1-2304-001-2

Test Date: 05/31/2023

Luminaire Tested: OHB-15SE-N-UNV-L930

Data in this report applies to families of products including OHB-15SE-N-UNV-L930.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2304-001-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 05/31/2023  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: METALUX  
 Catalog Number: **OHB-15SE-N-UNV-L930**  
 Description: 15SE OHB WITH APT LEDS, NARROW LENS, 90CRI 3000K

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 3051    | CRI (Ra): | 92.2 |      |      |
| CIE u':                   | 0.2497  | R1:       | 92.8 | R9:  | 60.2 |
| CIE v':                   | 0.5166  | R2:       | 95.6 | R10: | 88.6 |
| Duv:                      | -0.0027 | R3:       | 96.4 | R11: | 92.7 |
| CIE x:                    | 0.4295  | R4:       | 92.2 | R12: | 82.3 |
| CIE y:                    | 0.3950  | R5:       | 92.5 | R13: | 93.6 |
| CIE z:                    | 0.1755  | R6:       | 94.0 | R14: | 97.4 |
| Peak Wavelength (nm):     | 621     | R7:       | 91.7 |      |      |
| Dominant Wavelength (nm): | 583     | R8:       | 82.4 |      |      |
| Purity:                   | 47.8    |           |      |      |      |
| Rf:                       | 90.7    |           |      |      |      |
| Rg:                       | 101.5   |           |      |      |      |



### Test Conditions

Stabilization Time: 22M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.2/44%  
 Sphere Temperature (°C): 25.3

REPORT NUMBER: SP1-2304-001-2

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | 76INCH SPHERE IN0058  | 2/9/2023         | 8/9/2023             |
| Power Meter                    | XITRON 2801 IN0071    | 11/29/2022       | 11/29/2023           |
| AC Power Source                | CHROMA 61603 IN0063   | 11/28/2022       | 11/28/2023           |
| DC Power Source                | AGILENT E3634A IN0208 | 11/28/2022       | 11/28/2023           |
| Sphere Thermometer             | ONSET IN0085          | 11/28/2022       | 11/28/2023           |
| Room Thermometer               | ONSET IN0046          | 11/28/2022       | 11/28/2023           |

REPORT NUMBER: SP1-2304-001-2

CIE 1931 Chromaticity Diagram



CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2304-001-2

**Photopic Flux vs. Wavelength**



#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 5142             | NR               | 490       | 62439            | NR               | 620       | 231386           | NR               | 750       | 21976            | NR               | 880       | 7157             | NR               |
| 365       | 4540             | NR               | 495       | 73651            | NR               | 625       | 230941           | NR               | 755       | 19435            | NR               | 885       | 7445             | NR               |
| 370       | 4803             | NR               | 500       | 84837            | NR               | 630       | 226625           | NR               | 760       | 17457            | NR               | 890       | 5651             | NR               |
| 375       | 5429             | NR               | 505       | 96138            | NR               | 635       | 221573           | NR               | 765       | 15928            | NR               | 895       | 5663             | NR               |
| 380       | 5059             | NR               | 510       | 104675           | NR               | 640       | 214183           | NR               | 770       | 13612            | NR               | 900       | 4391             | NR               |
| 385       | 5164             | NR               | 515       | 112374           | NR               | 645       | 206197           | NR               | 775       | 12383            | NR               | 905       | 4718             | NR               |
| 390       | 4787             | NR               | 520       | 120074           | NR               | 650       | 195149           | NR               | 780       | 11099            | NR               | 910       | 4205             | NR               |
| 395       | 4429             | NR               | 525       | 125393           | NR               | 655       | 184048           | NR               | 785       | 9818             | NR               | 915       | 4466             | NR               |
| 400       | 3966             | NR               | 530       | 131080           | NR               | 660       | 171890           | NR               | 790       | 8853             | NR               | 920       | 4608             | NR               |
| 405       | 4026             | NR               | 535       | 137166           | NR               | 665       | 158117           | NR               | 795       | 8815             | NR               | 925       | 6506             | NR               |
| 410       | 4947             | NR               | 540       | 141770           | NR               | 670       | 144601           | NR               | 800       | 7747             | NR               | 930       | 6091             | NR               |
| 415       | 6735             | NR               | 545       | 146789           | NR               | 675       | 131155           | NR               | 805       | 7317             | NR               | 935       | 6242             | NR               |
| 420       | 10542            | NR               | 550       | 151664           | NR               | 680       | 119765           | NR               | 810       | 7417             | NR               | 940       | 5908             | NR               |
| 425       | 16995            | NR               | 555       | 157152           | NR               | 685       | 106544           | NR               | 815       | 7400             | NR               | 945       | 4377             | NR               |
| 430       | 27239            | NR               | 560       | 162379           | NR               | 690       | 94952            | NR               | 820       | 6832             | NR               | 950       | 6170             | NR               |
| 435       | 43016            | NR               | 565       | 167867           | NR               | 695       | 83928            | NR               | 825       | 6514             | NR               | 955       | 6143             | NR               |
| 440       | 69527            | NR               | 570       | 174214           | NR               | 700       | 74959            | NR               | 830       | 6419             | NR               | 960       | 5227             | NR               |
| 445       | 113795           | NR               | 575       | 179459           | NR               | 705       | 66186            | NR               | 835       | 6702             | NR               | 965       | 4363             | NR               |
| 450       | 137556           | NR               | 580       | 186493           | NR               | 710       | 58632            | NR               | 840       | 6224             | NR               | 970       | 9654             | NR               |
| 455       | 112457           | NR               | 585       | 194218           | NR               | 715       | 52023            | NR               | 845       | 5410             | NR               | 975       | 7378             | NR               |
| 460       | 88709            | NR               | 590       | 201759           | NR               | 720       | 46022            | NR               | 850       | 5183             | NR               | 980       | 8170             | NR               |
| 465       | 74548            | NR               | 595       | 208902           | NR               | 725       | 40235            | NR               | 855       | 6469             | NR               | 985       | 7350             | NR               |
| 470       | 58681            | NR               | 600       | 217002           | NR               | 730       | 35330            | NR               | 860       | 7161             | NR               | 990       | 8712             | NR               |
| 475       | 50369            | NR               | 605       | 222691           | NR               | 735       | 31141            | NR               | 865       | 5351             | NR               | 995       | 7670             | NR               |
| 480       | 50005            | NR               | 610       | 226497           | NR               | 740       | 27444            | NR               | 870       | 5943             | NR               | 1000      | 8916             | NR               |
| 485       | 54326            | NR               | 615       | 229506           | NR               | 745       | 24768            | NR               | 875       | 6650             | NR               |           |                  |                  |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 16819.9

S/P: 1.43

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 5142             | NR               | 490       | 62439            | NR               | 620       | 231386           | NR               | 750       | 21976            | NR               | 880       | 7157             | NR               |
| 365       | 4540             | NR               | 495       | 73651            | NR               | 625       | 230941           | NR               | 755       | 19435            | NR               | 885       | 7445             | NR               |
| 370       | 4803             | NR               | 500       | 84837            | NR               | 630       | 226625           | NR               | 760       | 17457            | NR               | 890       | 5651             | NR               |
| 375       | 5429             | NR               | 505       | 96138            | NR               | 635       | 221573           | NR               | 765       | 15928            | NR               | 895       | 5663             | NR               |
| 380       | 5059             | NR               | 510       | 104675           | NR               | 640       | 214183           | NR               | 770       | 13612            | NR               | 900       | 4391             | NR               |
| 385       | 5164             | NR               | 515       | 112374           | NR               | 645       | 206197           | NR               | 775       | 12383            | NR               | 905       | 4718             | NR               |
| 390       | 4787             | NR               | 520       | 120074           | NR               | 650       | 195149           | NR               | 780       | 11099            | NR               | 910       | 4205             | NR               |
| 395       | 4429             | NR               | 525       | 125393           | NR               | 655       | 184048           | NR               | 785       | 9818             | NR               | 915       | 4466             | NR               |
| 400       | 3966             | NR               | 530       | 131080           | NR               | 660       | 171890           | NR               | 790       | 8853             | NR               | 920       | 4608             | NR               |
| 405       | 4026             | NR               | 535       | 137166           | NR               | 665       | 158117           | NR               | 795       | 8815             | NR               | 925       | 6506             | NR               |
| 410       | 4947             | NR               | 540       | 141770           | NR               | 670       | 144601           | NR               | 800       | 7747             | NR               | 930       | 6091             | NR               |
| 415       | 6735             | NR               | 545       | 146789           | NR               | 675       | 131155           | NR               | 805       | 7317             | NR               | 935       | 6242             | NR               |
| 420       | 10542            | NR               | 550       | 151664           | NR               | 680       | 119765           | NR               | 810       | 7417             | NR               | 940       | 5908             | NR               |
| 425       | 16995            | NR               | 555       | 157152           | NR               | 685       | 106544           | NR               | 815       | 7400             | NR               | 945       | 4377             | NR               |
| 430       | 27239            | NR               | 560       | 162379           | NR               | 690       | 94952            | NR               | 820       | 6832             | NR               | 950       | 6170             | NR               |
| 435       | 43016            | NR               | 565       | 167867           | NR               | 695       | 83928            | NR               | 825       | 6514             | NR               | 955       | 6143             | NR               |
| 440       | 69527            | NR               | 570       | 174214           | NR               | 700       | 74959            | NR               | 830       | 6419             | NR               | 960       | 5227             | NR               |
| 445       | 113795           | NR               | 575       | 179459           | NR               | 705       | 66186            | NR               | 835       | 6702             | NR               | 965       | 4363             | NR               |
| 450       | 137556           | NR               | 580       | 186493           | NR               | 710       | 58632            | NR               | 840       | 6224             | NR               | 970       | 9654             | NR               |
| 455       | 112457           | NR               | 585       | 194218           | NR               | 715       | 52023            | NR               | 845       | 5410             | NR               | 975       | 7378             | NR               |
| 460       | 88709            | NR               | 590       | 201759           | NR               | 720       | 46022            | NR               | 850       | 5183             | NR               | 980       | 8170             | NR               |
| 465       | 74548            | NR               | 595       | 208902           | NR               | 725       | 40235            | NR               | 855       | 6469             | NR               | 985       | 7350             | NR               |
| 470       | 58681            | NR               | 600       | 217002           | NR               | 730       | 35330            | NR               | 860       | 7161             | NR               | 990       | 8712             | NR               |
| 475       | 50369            | NR               | 605       | 222691           | NR               | 735       | 31141            | NR               | 865       | 5351             | NR               | 995       | 7670             | NR               |
| 480       | 50005            | NR               | 610       | 226497           | NR               | 740       | 27444            | NR               | 870       | 5943             | NR               | 1000      | 8916             | NR               |
| 485       | 54326            | NR               | 615       | 229506           | NR               | 745       | 24768            | NR               | 875       | 6650             | NR               |           |                  |                  |

REPORT NUMBER: SP1-2304-001-2

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 6505.3 M/P: 0.55**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 5142             | NR               | 490       | 62439            | NR               | 620       | 231386           | NR               | 750       | 21976            | NR               | 880       | 7157             | NR               |
| 365       | 4540             | NR               | 495       | 73651            | NR               | 625       | 230941           | NR               | 755       | 19435            | NR               | 885       | 7445             | NR               |
| 370       | 4803             | NR               | 500       | 84837            | NR               | 630       | 226625           | NR               | 760       | 17457            | NR               | 890       | 5651             | NR               |
| 375       | 5429             | NR               | 505       | 96138            | NR               | 635       | 221573           | NR               | 765       | 15928            | NR               | 895       | 5663             | NR               |
| 380       | 5059             | NR               | 510       | 104675           | NR               | 640       | 214183           | NR               | 770       | 13612            | NR               | 900       | 4391             | NR               |
| 385       | 5164             | NR               | 515       | 112374           | NR               | 645       | 206197           | NR               | 775       | 12383            | NR               | 905       | 4718             | NR               |
| 390       | 4787             | NR               | 520       | 120074           | NR               | 650       | 195149           | NR               | 780       | 11099            | NR               | 910       | 4205             | NR               |
| 395       | 4429             | NR               | 525       | 125393           | NR               | 655       | 184048           | NR               | 785       | 9818             | NR               | 915       | 4466             | NR               |
| 400       | 3966             | NR               | 530       | 131080           | NR               | 660       | 171890           | NR               | 790       | 8853             | NR               | 920       | 4608             | NR               |
| 405       | 4026             | NR               | 535       | 137166           | NR               | 665       | 158117           | NR               | 795       | 8815             | NR               | 925       | 6506             | NR               |
| 410       | 4947             | NR               | 540       | 141770           | NR               | 670       | 144601           | NR               | 800       | 7747             | NR               | 930       | 6091             | NR               |
| 415       | 6735             | NR               | 545       | 146789           | NR               | 675       | 131155           | NR               | 805       | 7317             | NR               | 935       | 6242             | NR               |
| 420       | 10542            | NR               | 550       | 151664           | NR               | 680       | 119765           | NR               | 810       | 7417             | NR               | 940       | 5908             | NR               |
| 425       | 16995            | NR               | 555       | 157152           | NR               | 685       | 106544           | NR               | 815       | 7400             | NR               | 945       | 4377             | NR               |
| 430       | 27239            | NR               | 560       | 162379           | NR               | 690       | 94952            | NR               | 820       | 6832             | NR               | 950       | 6170             | NR               |
| 435       | 43016            | NR               | 565       | 167867           | NR               | 695       | 83928            | NR               | 825       | 6514             | NR               | 955       | 6143             | NR               |
| 440       | 69527            | NR               | 570       | 174214           | NR               | 700       | 74959            | NR               | 830       | 6419             | NR               | 960       | 5227             | NR               |
| 445       | 113795           | NR               | 575       | 179459           | NR               | 705       | 66186            | NR               | 835       | 6702             | NR               | 965       | 4363             | NR               |
| 450       | 137556           | NR               | 580       | 186493           | NR               | 710       | 58632            | NR               | 840       | 6224             | NR               | 970       | 9654             | NR               |
| 455       | 112457           | NR               | 585       | 194218           | NR               | 715       | 52023            | NR               | 845       | 5410             | NR               | 975       | 7378             | NR               |
| 460       | 88709            | NR               | 590       | 201759           | NR               | 720       | 46022            | NR               | 850       | 5183             | NR               | 980       | 8170             | NR               |
| 465       | 74548            | NR               | 595       | 208902           | NR               | 725       | 40235            | NR               | 855       | 6469             | NR               | 985       | 7350             | NR               |
| 470       | 58681            | NR               | 600       | 217002           | NR               | 730       | 35330            | NR               | 860       | 7161             | NR               | 990       | 8712             | NR               |
| 475       | 50369            | NR               | 605       | 222691           | NR               | 735       | 31141            | NR               | 865       | 5351             | NR               | 995       | 7670             | NR               |
| 480       | 50005            | NR               | 610       | 226497           | NR               | 740       | 27444            | NR               | 870       | 5943             | NR               | 1000      | 8916             | NR               |
| 485       | 54326            | NR               | 615       | 229506           | NR               | 745       | 24768            | NR               | 875       | 6650             | NR               |           |                  |                  |

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**TM-30-18**

**Summary**

$R_f = 90.7$   
 $R_g = 101.5$   
 CIE  $R_a = 92.2$   
 $R_9 = 60.2$



**Color Vector Graphics**



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**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 87 | CES51 = 97 | CES76 = 83 |
| CES02 = 63 | CES27 = 96 | CES52 = 95 | CES77 = 89 |
| CES03 = 32 | CES28 = 94 | CES53 = 92 | CES78 = 82 |
| CES04 = 70 | CES29 = 87 | CES54 = 97 | CES79 = 94 |
| CES05 = 51 | CES30 = 95 | CES55 = 96 | CES80 = 92 |
| CES06 = 51 | CES31 = 88 | CES56 = 93 | CES81 = 86 |
| CES07 = 43 | CES32 = 83 | CES57 = 93 | CES82 = 96 |
| CES08 = 42 | CES33 = 90 | CES58 = 94 | CES83 = 95 |
| CES09 = 29 | CES34 = 89 | CES59 = 97 | CES84 = 95 |
| CES10 = 76 | CES35 = 94 | CES60 = 96 | CES85 = 85 |
| CES11 = 59 | CES36 = 90 | CES61 = 94 | CES86 = 85 |
| CES12 = 65 | CES37 = 92 | CES62 = 95 | CES87 = 90 |
| CES13 = 44 | CES38 = 99 | CES63 = 92 | CES88 = 95 |
| CES14 = 74 | CES39 = 98 | CES64 = 91 | CES89 = 85 |
| CES15 = 72 | CES40 = 95 | CES65 = 89 | CES90 = 95 |
| CES16 = 48 | CES41 = 96 | CES66 = 89 | CES91 = 83 |
| CES17 = 50 | CES42 = 91 | CES67 = 88 | CES92 = 82 |
| CES18 = 57 | CES43 = 87 | CES68 = 88 | CES93 = 89 |
| CES19 = 72 | CES44 = 99 | CES69 = 90 | CES94 = 80 |
| CES20 = 67 | CES45 = 92 | CES70 = 85 | CES95 = 85 |
| CES21 = 86 | CES46 = 92 | CES71 = 84 | CES96 = 91 |
| CES22 = 79 | CES47 = 91 | CES72 = 94 | CES97 = 93 |
| CES23 = 92 | CES48 = 93 | CES73 = 80 | CES98 = 93 |
| CES24 = 91 | CES49 = 90 | CES74 = 94 | CES99 = 91 |
| CES25 = 72 | CES50 = 96 | CES75 = 84 |            |



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**Color Rendition by Hue-Angle Bin**



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**Measure Comparisons**



(END OF REPORT)